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Army Training and Testing Area Carrying Capacity (ATTACC) Vehicle Severity Factor (VSF) and Local Condition Factor (LCF) Calculator User Manual, Version 1.0

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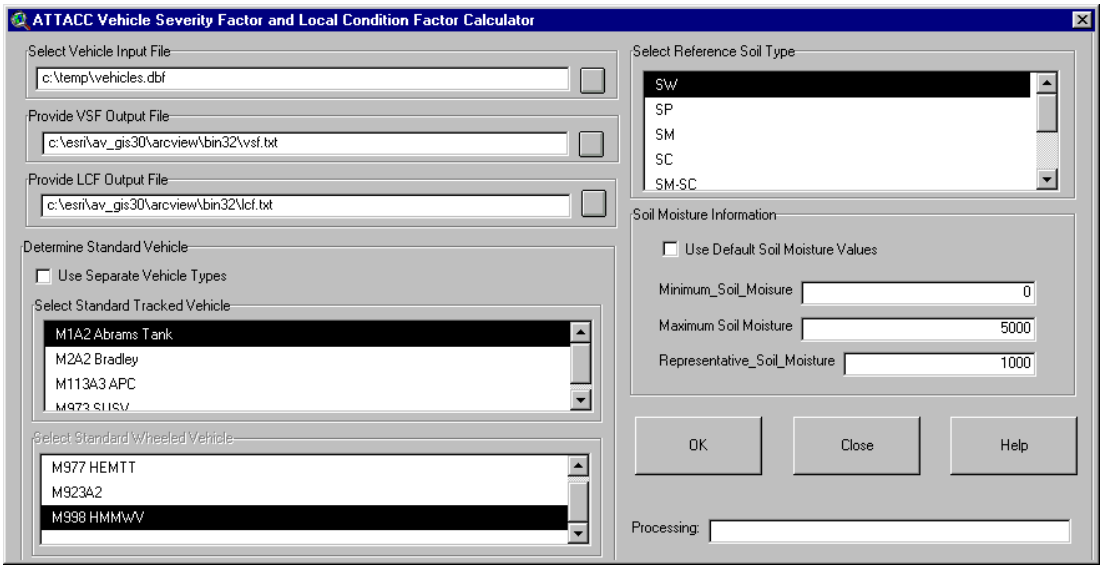
August 2002



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Strategic Environmental Research and Development Program
Improving Mission Readiness Through Environmental Research

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Foreword

This study was conducted for the Strategic Environmental Research and Development Program (SERDP) under Project CS-1102, "Improved Units of Measure for Training and Testing Area Carrying Capacity Estimation." The technical monitor was Dr. Robert Holst, Compliance and Conservation Program Manager, SERDP. Bradley P. Smith is Executive Director, SERDP.

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Contents

Foreword **2**

List of Figures, Tables, and Equation **5**

1 Introduction **7**

Background 7

Objective 8

Approach 8

Mode of Technology Transfer 11

2 Installing the ATTACC VSF/LCF Calculator ArcView Extension **12**

3 Loading the ATTACC VSF/LCF Calculator Extension **14**

4 ATTACC VSF/LCF Calculator Program Use **18**

ATTACC VSF/LCF Calculator Input Fields 18

Select Vehicle Input File *19*

Provide VSF Output File *19*

Provide LCF Output File *20*

Use Separate Vehicle Types *20*

Select Standard Tracked Vehicle *20*

Select Standard Wheeled Vehicle *20*

Select Reference Soil Type *20*

Use Default Soil Moisture Values *21*

Minimum Soil Moisture *21*

Maximum Soil Moisture *22*

Representative Soil Moisture *22*

OK Button *22*

Close Button *22*

Help Button *22*

Processing Messages Display *22*

ATTACC VSF/LCF Calculator Output 22

ATTACC LCF Chart *23*

ATTACC LCF Tabular Data *24*

ATTACC VSF Tabular Data *24*

Vehicle Input Data *25*

ATTACC VSF/LCF Calculator Online Help 26

5 Other Technical Aspects of the ATTACC VSF/LCF Calculator 27

Transferring ATTACC VSF/LCF Data to Other ATTACC Systems 27

ATTACC VSF/LCF Calculator Error Messages 28

ATTACC VSF/LCF Calculator Technical Support 29

ATTACC VSF/LCF Calculator System Requirements 29

References 30

Acronyms and Abbreviations 31

Appendix A: Installing or Removing the ATTACC VSF/LCF Calculator and Related ATTACC LCM Tools 33

Installing the VSF/LCF Calculator and Related LCM Tools 33

Removing and Updating ATTACC LCM and Related Tools 39

Appendix B: Installation Information Infrastructure Architecture (I3A) Technical Review Process for ATTACC LCM 43

CERL Distribution 44

Report Documentation Page 45

List of Figures, Tables, and Equation

Figures

1 ATTACC software modules 10
2 Windows® run program dialog box 13
3 ArcView menu. To load the ATTACC LCM extension 14
4 ArcView Extensions dialog box for selecting ATTACC VSF/LCF Calculator 14
5 ArcView window showing ATTACC <*VSF/LCF Calculator*> button 15
6 ATTACC VSF/LCF Calculator introduction screen 15
7 ATTACC VSF/LCF Calculator input dialog box 16
8 Typical ATTACC VSF/LCF Calculator output 16
9 ArcView <*Stop*> button to terminate ATTACC LCM program 17
10 ATTACC VSF/LCF Calculator input dialog box 18
11 Typical ATTACC VSF/LCF output 23
12 LCF chart 23
13 LCF tabular data 24
14 VSF tabular data 25
15 Vehicle input data 25
16 Help session dialog box 26
17 Data export menu option 27
18 Export data formats 28
A1 Windows® run program dialog box 33
A2 Browse dialog box used to locate the installation program 34
A3 ATTACC LCM installation program initialization screen 34
A4 ATTACC LCM installation welcome screen 35
A5 ATTACC LCM installation program dialog box to specify destination folder for ATTACC LCM extension files 35
A6 ATTACC LCM installation program dialog box to specify destination folder for help files 36
A7 ATTACC LCM installation program dialog box to specify destination folder for sample data files 36
A8 ATTACC LCM installation program Setup Type selection dialog box 37
A9 ATTACC LCM installation program Select Components dialog box 37

A10 ATTACC LCM installation Program Folder selection dialog box....38
A11 ATTACC LCM installation program Setup Status dialog box....38
A12 ATTACC LCM installation program completion screen....39
A13 Control Panel dialog box....39
A14 Add/Remove Programs dialog box....40
A15 ATTACC LCM remove/update program options dialog box....41
A16 ATTACC LCM installation program maintenance and uninstall dialog box....41
A17 ATTACC LCM remove/update program Setup Status dialog box....42
A18 ATTACC LCM remove/update program finish dialog box....42

Tables

1 Vehicle characteristics input file format requirements....19
2 USCS soil types....21

Equation

1 ATTACC Training Load (MIMs) equation....9

1 Introduction

Background

The Integrated Training Area Management (ITAM) Program is the Army's formal strategy focusing on sustained use of training and testing lands. The Army Training and Testing Area Carrying Capacity (ATTACC) program is part of the ITAM Program, under proponency responsibility of the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS). ATTACC is a methodology for estimating the operations and support (O&S) costs of using land at Army installations for training and testing purposes. The ATTACC methodology includes specific processes and algorithms to predict land rehabilitation and maintenance (LRAM) requirements based on training and testing load and environmental conditions.

The ATTACC initiative began in May 1995 with a tasking from the Office of the Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health) and the ODCSOPS (Training Directorate) to the U.S. Army Concepts Analysis Agency (CAA). The tasking Terms of Reference specified four objectives:

2. Develop a methodology for estimating the operations and support costs of using land at Army installations for the training of ground forces.
3. Identify the key operations and support cost drivers of using land for ground force training by type of army unit and installation.
4. Develop cost estimating relationships that link land usage operations and support costs to a measure of training performance.
5. Use the cost estimating relationship to develop land-related operations and support costs of ground forces training for selected Army units and installations.

In response to the tasking, the U.S. Army CAA, in conjunction with the ATTACC project team, submitted Study Report CAA-SR-96-5 "Evaluation of Land Value Study (ELVS)" (CAA 1996). That report outlined a methodology for meeting the stated objectives and demonstrated the methodology for heavy unit training at Fort Hood, TX. In May 1996 the Chief, Training Simulations Division, ODCSOPS (DAMO-TRS) redesignated the methodology outlined in the ELVS report as the ATTACC methodology and extended the objectives to include ITAM-wide implementation of ATTACC. Since then, the ATTACC project team has extended the

methodology to include almost all types of Army units and institutional training and implemented ATTACC at several installations in various ecoregions. Headquarters, Department of the Army (HQDA) is also using ATTACC to estimate land maintenance requirements for the ITAM Program and is integrating ATTACC into the Army's Training Resource Model (TRM), as part of direct OPTEMPO. At the installation level, the ATTACC methodology is being integrated into training land management systems to support land management decisions.

Objective

The objective of this User Manual is to provide instructions for using the ATTACC Vehicle Severity Factor (VSF) and Local Condition Factor (LCF) Calculator software. Appendix A contains instructions for installing the software. Development of the VSF/LCF Calculator software is documented in Sullivan and Anderson (2000).

Approach

The ATTACC methodology consists of three main components: (1) training load, (2) land condition, and (3) cost analysis. ATTACC measures land condition in terms of the erosion status. Erosion status is the ratio of predicted erosion rates to tolerable erosion rates, with greater values indicating poorer land condition and lesser values indicating better land condition. Erosion rates are estimated using a modification of the Revised Universal Soil Loss Equation (RUSLE), a modification of the Wind Erosion Equation, and a modification of a dust emission model.

Training load is the term used to describe the collective impact of all military activities that occur on a given parcel of land. ATTACC measures training load in terms of Maneuver Impact Miles (MIMs). One MIM has the equivalent impact of an M1A2 tank driving 1 mile in an Armor Battalion field training exercise (FTX). The MIM value for each mission activity is derived from the numbers and types of vehicles used, the miles that vehicles travel, and the type of training event.

The mathematical equation for calculating training load in ATTACC is shown in equation 1. Training load is calculated using Training Impact Factors (TIFs). TIFs include the Event Severity Factor (ESF), Vehicle Severity Factor (VSF), Vehicle Off-Road Factor (VOF), and Vehicle Conversion Factor (VCF). The ESF is a multiplier that represents the relative impact of an event, as compared to the standard event (Armor Battalion FTX). The VSF is a multiplier that represents the relative impact of a vehicle, as compared to the standard vehicle (M1A2 tank). The VOF is a multiplier that represents the percentage of vehicle mileage typically driven off improved

roads. The VCF is a multiplier that represents the area impacted by a vehicle, as compared to the area impacted by the standard vehicle.

Equation 1. ATTACC Training Load (MIMs) equation.

$$MIMs = \sum_{E=1}^{e}\left[\left(\sum_{V=1}^{v}\left(Number_V * Mileage_V * VSF_V * VOF_V * VCF_V\right)\right) * Duration_E * ESF_E\right]$$

where:

MIM = normalized training load (maneuver impact miles)
E = event (dimensionless)
e = number of events (dimensionless)
V = vehicle type (dimensionless)
v = number of types of vehicles in event E (dimensionless)
Mileage = daily mileage for vehicle type V for event type E (miles)
Number = number of vehicles of type V (dimensionless)
VSF = vehicle severity factor for vehicle type V (dimensionless)
VOF = vehicle off-road factor for vehicle type V (dimensionless)
VCF = vehicle conversion factor for vehicle type V (dimensionless)
Duration = number of days for event type E (days)
ESF = event severity factor for event type E (dimensionless)

Training load projections are based on Army training doctrine and databases (Battalion Level Training Model [BLTM], and Combined Arms Training Strategy [CATS]). These sources identify the number, type, and duration of events, which various unit types will conduct on an annual basis. This information, when combined with unit stationing information from the Army Stationing and Installation Plan (ASIP), provides an estimate of a projected training load. Alternatively, training load information can be obtained from the Range Facility Management Support System (RFMSS) software program. These data sources provide the type of event, number and type of vehicles, and mileage projections.

Several decision support tools have been developed to simplify and automate the ATTACC methodology. These decision support tools are the Workplan Analysis Module (WAM), ATTACC Integration Module (AIM), ATTACC Functions of the RFMSS, and the Land Condition Module (LCM). Figure 1 shows the relationship of the ATTACC decision support tools.

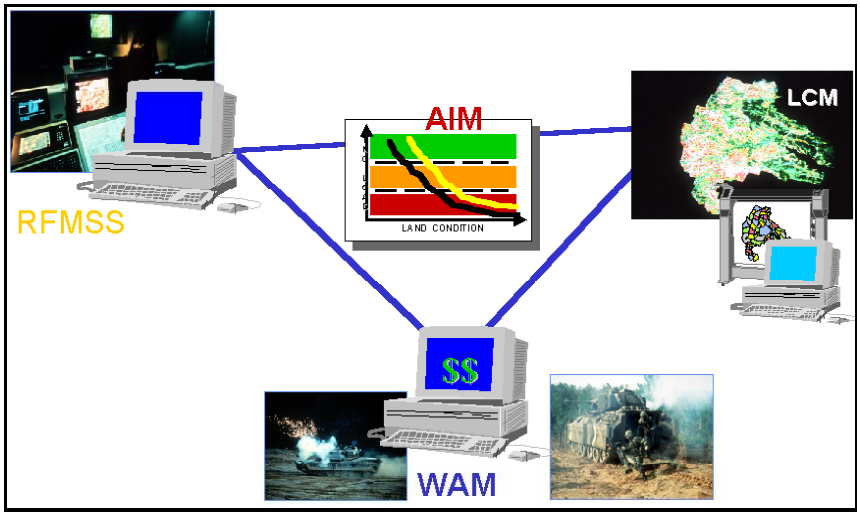

Figure 1. ATTACC software modules.

The WAM consists of computer-based software programs that (1) develop ITAM projects and costs, (2) transmit the annual work plan and its projects, and (3) update work projects throughout the fiscal year. ITAM managers at installations, major Army commands (MACOMs), and HQDA use the WAM program to build and track ITAM projects from submission to completion and to provide standard project and work plan reports. The point of contact (POC) for WAM is Larry Jantz, Army Training Support Center (ATSC), ATTN: ATIS-ATMS, Fort Eustis, VA 23604; 757-878-3090.

The RFMSS is a computer system that automates range control operations. It supports the key range management functions of scheduling, firing desk operations, and ITAM/ATTACC. RFMSS ATTACC functions can (1) calculate training load as events are scheduled and (2) compare training load to Red-Amber-Green MIMs threshold values (generated in AIM). The RFMSS POC is Larry Jantz, ATSC, 757-878-3090.

AIM is a computer-based software program that (1) integrates data from WAM, LCM, and RFMSS, (2) generates LRAM funding requirements, (3) predicts land condition, and (4) calculates MIM thresholds for use in RFMSS (see the *ATTACC Handbook* for detailed information on MIMs [U.S. Army Environmental Center (USAEC) 1999]). Installation-level ITAM managers use AIM to (1) analyze WAM project data to generate LRAM requirements, (2) analyze "what-if" training scenario impact, (3) calculate MIMs for specific units and events, and (4) calculate MIM thresholds. AIM integrates the three components of ATTACC. The AIM POC is Larry Jantz, ATSC, 757-878-3090.

The LCM is an ArcView* geographical information system (GIS)-based software application that estimates changes in land condition associated with mission activity. LCM automates the ATTACC Methodology for generating land condition curves. Land Condition Trend Analysis (LCTA)/GIS coordinators use the LCM and installation natural resources GIS data layers to generate land condition curves, which are an important input to AIM. The POC for the LCM is George Teachman, USAEC, ATTN: SFIM-AEC-EQN, 5179 Hoadley Road, Aberdeen Proving Ground, MD 21010-5401; 410-436-1593. Both the ATTACC LCM and VSF/LCF Calculator software packages are I3A-approved for use at Army installations (see Appendix B).

Mode of Technology Transfer

The ATTACC VSF/LCF software documented in this report is available from the Engineer Research and Development Center/Construction Engineering Research Laboratory (ERDC/CERL). The *ATTACC Handbook* (USAEC 1999), and Army Regulation 350-4, *Integrated Training Area Management (ITAM)* document the standing operating procedures (SOPs) for implementing ATTACC.

This report will be made accessible through the World Wide Web (WWW) at URL:
http://www.cecer.army.mil

* ArcView is a product of Environmental Systems Research Institute (ESRI), 380 New York Street, Redlands, CA, 92373-8100; http://www.esri.com

2 Installing the ATTACC VSF/LCF Calculator ArcView Extension

To manually install ATTACC VSF/LCF Calculator files on your computer, complete the following tasks.

1. Copy the file *VSFLCFext.avx* to your ESRI ArcView extension directory. This directory is typically "C:\ESRI\AV_GIS30\ARCVIEW\EXT32". See your ArcView documentation if you did not accept default directory names when installing the ArcView software. The *VSFLCFext.avx* file is the ATTACC LCM ArcView extension. ArcView extensions are add-on programs that provide ArcView users with specialized GIS functionality. Note that the ATTACC VSF/LCF Calculator does not require the ArcView extension for Spatial Analyst.
2. Copy *VSFLCF.hlp* to your ArcView help directory. This directory is typically "C:\ESRI\AV_GIS30\ARCVIEW\HELP". See your ArcView documentation if you did not accept default directory names when installing the ArcView software. This file is the VSF/LCF Calculator online Windows® help sessions. The *VSFLCF.hlp* file provides an online Windows® help session for using the VSF/LCF Calculator extension.
3. The VSF/LCF Calculator program has now been installed. You are ready to use the VSF/LCF Calculator program.

To use the setup program to automatically install VSF/LCF Calculator files on your computer, insert the ATTACC LCM compact disk (CD) into your CD drive. Select the <*Start*> button on the Windows® button bar at the bottom of your screen. Select the <*Run*> menu item. A run program dialog box will appear (Figure 2). Enter the CD drive letter and "*setup.exe*". Then select the <*OK*> button. The ATTACC LCM setup program will begin. Follow the directions in the ATTACC LCM setup program to install the ATTACC LCM program. For more information on program installation, see Appendix A.

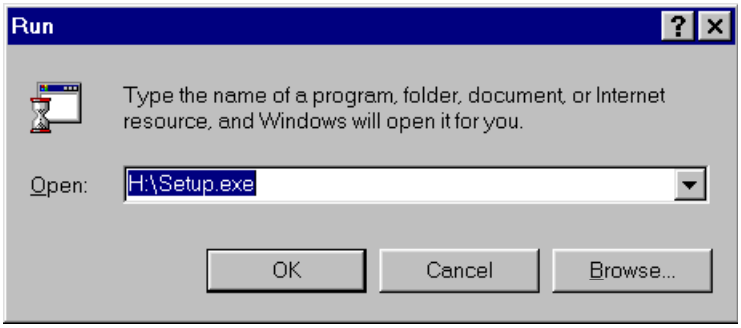

Figure 2. Windows® run program dialog box.

3 Loading the ATTACC VSF/LCF Calculator Extension

To use an ArcView extension during an ArcView session, the extension must be loaded. To load the VSF/LCF Calculator extension into ArcView, complete the following tasks after starting ArcView.

1. From the File menu, select the <*Extensions*> menu option. The Extensions dialog box appears, displaying the available extensions. Figure 3 shows the Arc-view menu.

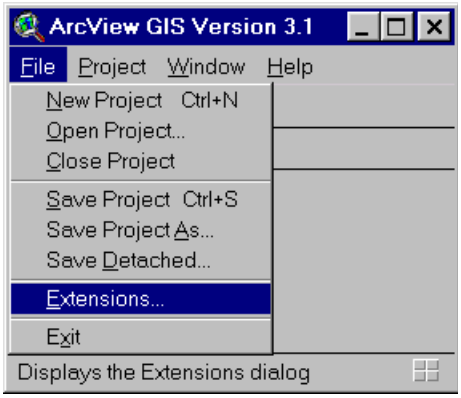

Figure 3. ArcView menu. To load the ATTACC LCM extension.

2. Select the extension titled <*ATTACC VSF/LCF*>. Press the <*OK*> button. The VSF/LCF Calculator extension is now loaded. Figure 4 shows the ArcView Extensions dialog box. Notice that the information box provides additional information about the extension. The VSF/LCF Calculator extension provides POCs for support using the VSF/LCF Calculator.

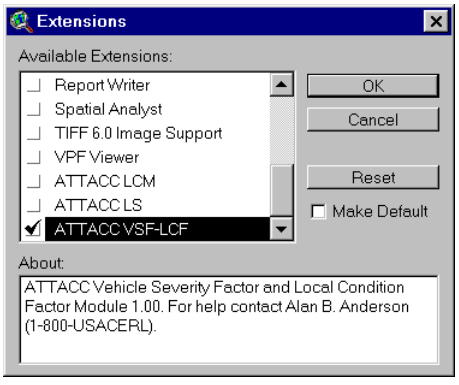

Figure 4. ArcView Extensions dialog box for selecting ATTACC VSF/LCF Calculator.

3. After loading the extension, a <*VSF/LCF Calculator*> button will appear on a project button bar (usually the row of buttons located directly below the menu bar) whenever a project is opened. The <*VSF/LCF Calculator*> button is not visible if a project is not opened. It will only be visible when the project window is the active window. To run the VSF/LCF Calculator program, press the <*VSF/LCF Calculator menu*> button, which looks like a tank. Figure 5 shows this menu button.

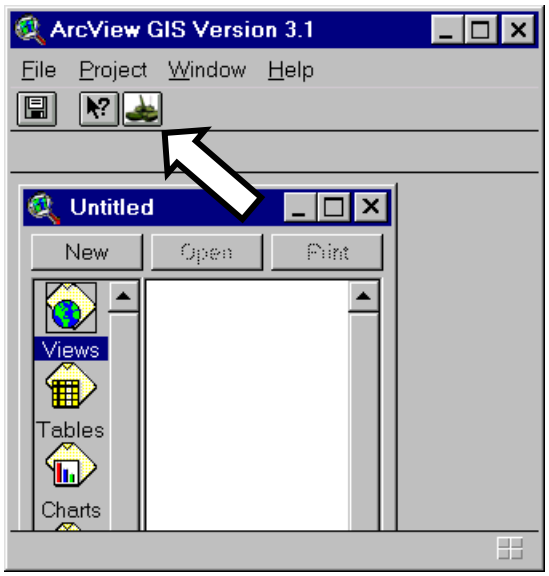

Figure 5. ArcView window showing ATTACC <*VSF/LCF Calculator*> button.

4. After the <*VSF/LCF Calculator*> button is selected, the ATTACC Introduction screen is displayed (Figure 6). After selecting <*OK*> on the screen, the VSF/LCF Calculator input dialog box (Figure 7) will appear. Provide requested information and select <*OK*> to run the program. You will need to provide input data layer names, output data layer names, and analysis options. Chapter 4 provides detailed information on each input field. Online help is available when running the program. While the program is running, progress messages will be displayed in the <*Processing*> field at the bottom of the dialog box.

Figure 6. ATTACC VSF/LCF Calculator introduction screen.

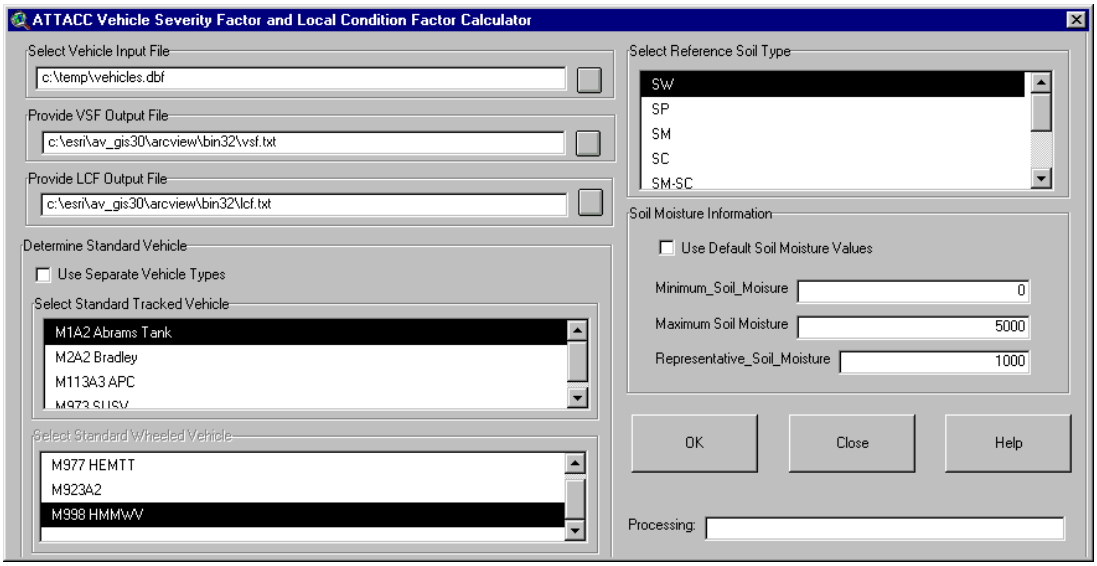

Figure 7. ATTACC VSF/LCF Calculator input dialog box.

After the program completes, output will be displayed in the project window. Chapter 4 describes each output in detail. Figure 8 shows typical program output.

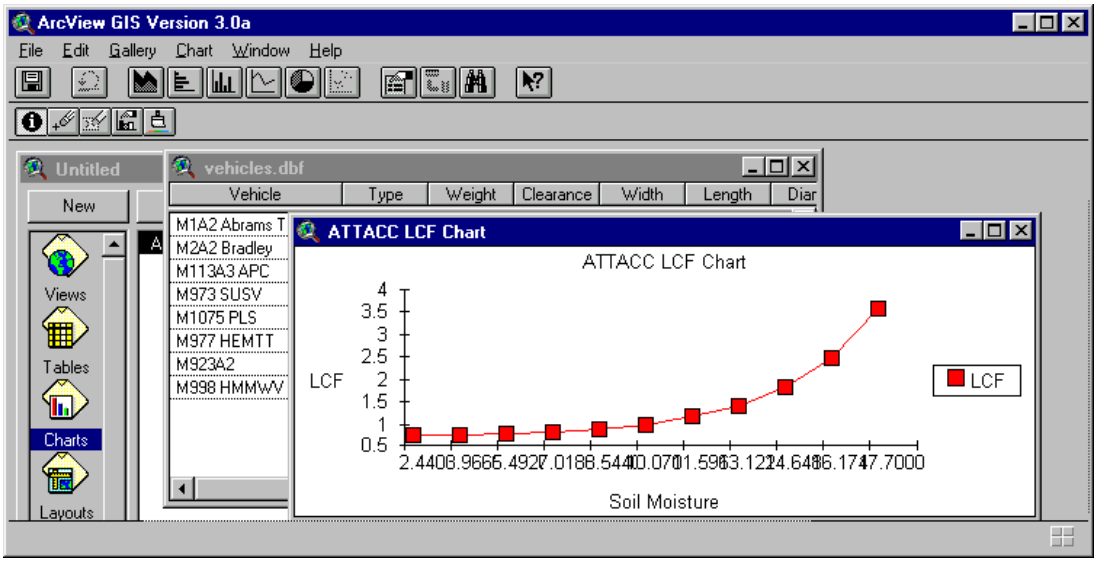

Figure 8. Typical ATTACC VSF/LCF Calculator output.

5. To terminate the VSF/LCF Calculator program before completion, press the <*Stop*> button on the lower right hand corner of the ArcView program window. Figure 9 shows the <*Stop*> button in a typical ArcView program window.

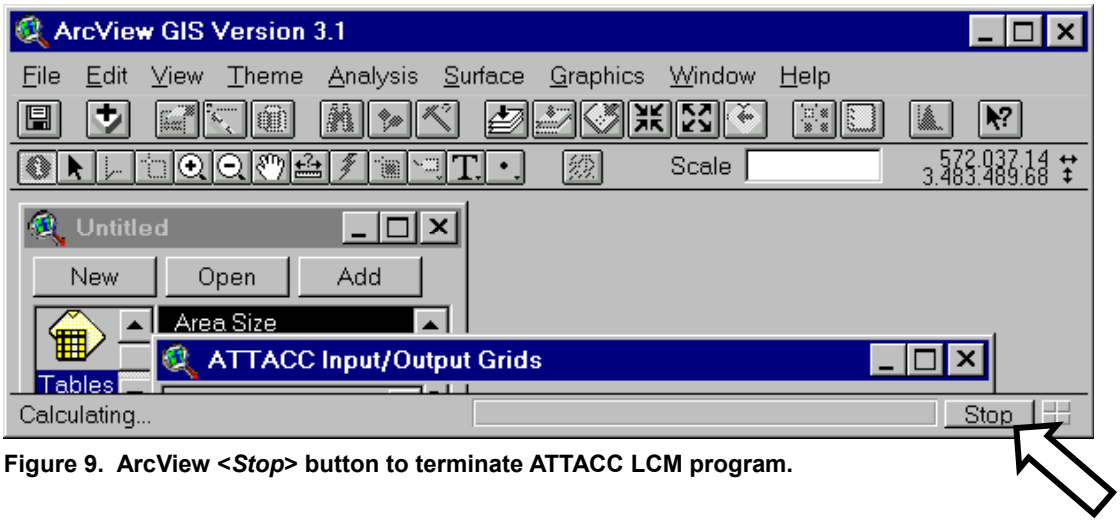

Figure 9. ArcView <*Stop*> button to terminate ATTACC LCM program.

You must open the VSF/LCF Calculator extension each time you want to use it unless you set up ArcView to automatically load the extension. See the ArcView documentation provided with the ArcView GIS software for details on automatically loading extensions.

4 ATTACC VSF/LCF Calculator Program Use

ATTACC VSF/LCF Calculator Input Fields

The VSF/LCF Calculator uses nine input fields. The data required depend on the analysis options selected. The VSF/LCF Calculator disables/enables input and output fields depending on the analysis options selected. If required data are not specified or the files are missing, the VSF/LCF Calculator will notify you of the problem. The following sections summarize the data required to run the VSF/LCF Calculator program. For more information on ATTACC methodology, refer to the *ATTACC Handbook* (USAEC 1999). The handbook is available on the ITAM home page and as a Windows® help session (see the ATTACC LCM User Manual [Anderson 2001]).

Figure 10 shows the VSF/LCF Calculator input dialog box. The following sections refer to each of the input fields using the same names as shown in the dialog box. The VSF/LCF Calculator input dialog will save input values between work sessions. If you exit ArcView, the dialog box input values will be saved. The next time you use the VSF/LCF Calculator extension, your input values will be restored.

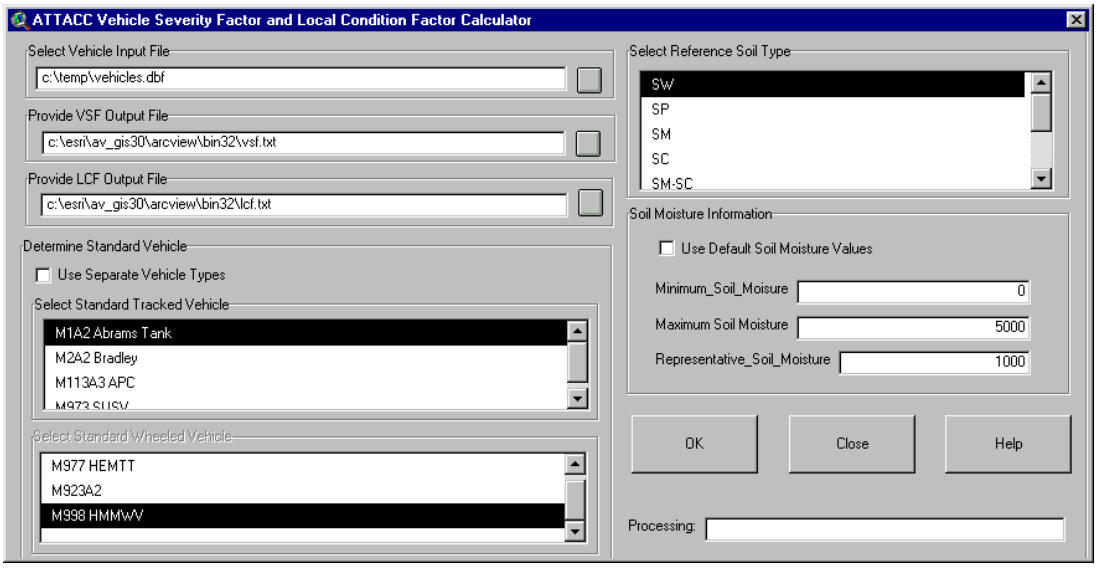

Figure 10. ATTACC VSF/LCF Calculator input dialog box.

Select Vehicle Input File

Provide the name and location of the vehicle input file. The <*Select File*> button to the right of this field can be used to locate an existing file on your computer hard drive. The vehicle input file contains data on numerous tactical vehicles used by the U.S. Army in field training exercises. This information includes vehicle type (tracked or wheeled), weight, ground clearance, track/tire width, track length, tire diameter, tire deflection, and tire section height. These data are necessary to calculate the environmental damage resulting from vehicle traffic. This damage is determined not only by vehicle characteristics, but also by existing site conditions. Information derived from these parameters is important in determining site damage.

A default vehicle input file has been provided with the installation CD. The file *vehicle.dbs* contains information on all ATTACC vehicle types. This file can be augmented or updated with more recent information. However, the file must contain the correct number of data fields and in the correct format. Data must be stored in a Dbase format compatible with ArcView. See your ArcView documentation for supported versions of Dbase. Table 1 lists the required data fields, field names, and data types. Additional data fields can exist in the file but will not be used. Not all data fields are required for each vehicle. Wheeled and tracked vehicles use different variables to characterize the vehicle. See Sullivan and Anderson (2000) for more detailed descriptions of data requirements.

Table 1. Vehicle characteristics input file format requirements.

Field	Name	Type	Description
1	VEHICLE	Text	Vehicle description. This value needs to match naming conventions used in RFMSS and AIM databases.
2	TYPE	Text	Indicates if vehicle is tracked or wheeled.
3	WEIGHT	Float	Total weight of vehicle in pounds.
4	CLEARANCE	Float	Vehicle ground clearance in inches.
5	WIDTH	Float	Track or wheel width in inches.
6	LENGTH	Float	Track length in inches.
7	DIAMETER	Float	Tire diameter in inches.
8	DEFLECTION	Float	Tire deflection in inches.
9	SECTION	Float	Tire section height in inches.

Provide VSF Output File

Provide the name and location of the VSF output file. The <*Select File*> button can be used to locate an existing file on your computer hard drive. The VSF output file

will be used to store estimated VSF values for each of the vehicles listed in the vehicle input file.

Provide LCF Output File

Provide the name and location of the LCF output file. The <*Select File*> button can be used to locate an existing file on your computer hard drive. The LCF output file is used to store estimated LCF values for the soil type specified and the range of soil moisture values specified.

Use Separate Vehicle Types

The VSF/LCF Calculator can calculate VSF for any reference vehicle. If different reference vehicles are required for wheeled and tracked vehicles, check the <*Use Separate Vehicle Types*> check box. If this option is not selected, the wheeled vehicle list will be inactive. When this option is selected, the wheeled vehicle list will be activated to allow user input.

Select Standard Tracked Vehicle

Select the reference tracked vehicle for calculating ATTACC VSF and ATTACC LCF. The reference vehicle will always have a VSF equal to one. The VSF of all other vehicles will be calculated relative to this reference vehicle.

Select Standard Wheeled Vehicle

Select the reference wheeled vehicle for calculating VSF and LCF. The reference vehicle will always have a VSF equal to one. The VSF of all other vehicles will be calculated relative to this reference vehicle. This list of wheeled vehicles is only available if the <*Use Separate Vehicles Types*> option has been selected.

Select Reference Soil Type

Select the dominant soil type for the area of interest. Table 2 lists Unified Soil Classification System (USCS) soil types (USAWES 1960). USCS soil type values are available for most published soil surveys from the U.S. Department of Agriculture's (USDA's) Natural Resource Conservation Service (NRCS). USCS soil type values can be found in published soil survey manuals. The NRCS also maintains an electronic database of soil series attribute values including USCS soil type values. This database is the Map Unit Interpretation Database (MUIR), which can be accessed at: http://www.statlab.iastate.edu/soils/muir.

Table 2. USCS soil types.

Soil Type Code	Description
SW	This group comprises well-graded gravelly and sandy soils having little or no nonplastic fines.
SP	This group comprises poorly-graded gravels and sands containing little or no nonplastic fines.
SM	This group comprises gravels or sands with fines having low or no plasticity.
SC	This group comprises sandy soils with fines that have either low or high plasticity. The gradation of the materials is not considered significant and both well- and poorly-graded materials are included.
SM-SC	A borderline soil that exhibits characteristics of both SM and SC soil groups. The SM soil group comprises silty sands while the SC group comprises clayey sands.
CL	Primarily inorganic clays with low liquid limit (i.e., less than 50).
ML	This group comprises predominantly silty materials and micaceous or diatomaceous soils with low liquid limits.
CLML	This group comprises a borderline soil that exhibits characteristics of both CL and ML soil groups. The CL soil comprises low plasticity clays and the ML soil group comprises silts with low plasticity.
CH	This group comprises predominantly primarily inorganic clays with high liquid limit (i.e., greater than 50).
MH	This group comprises predominantly silty materials and micaceous or diatomaceous soils with high liquid limits.
GC	This group comprises gravelly soils with fines that have either low or high plasticity. The gradation of the materials is not considered significant and both well- and poorly-graded materials are included.
Pt	This group comprises highly organic soils that are very compressible and frequently have fibrous vegetable matter.
OL	This group is characterized by the presence of organic matter. Organic silts and clays are classified in this group if they have materials with low plasticity.
OH	This group is characterized by the presence of organic matter. Organic silts and clays are classified in this group if they have materials with high plasticity.

Use Default Soil Moisture Values

The ATTACC VSF/LCF Calculator will calculate VSF and LCF values for a representative soil type. The VSF and LCF values will be based on a reference soil moisture condition. You may use the default soil moisture values provided by the calculator or you may provide your own values. Check the <*Use Default Soil Moisture Values*> box to use default values provided with the software. Clear the check box to provide your own values. If this option is selected, the minimum, maximum, and reference soil moisture input fields will be locked and filled with default values.

Minimum Soil Moisture

This value is the minimum soil moisture typically present at your installation for the specified soil type. This field will display the default minimum soil moisture value typically found for the specified soil type. You may enter your own value as appropriate.

Maximum Soil Moisture

This value is the maximum soil moisture typically present at your installation for the specified soil type. This field will display the default maximum soil moisture value typically found for the specified soil type. You may enter your own value as appropriate.

Representative Soil Moisture

This value is the soil moisture typically found at your installation for the soil type specified. This field will display the default representative soil moisture value typically used to estimate VSF and LCF values. You may enter your own value if you wish to use a different reference value.

OK Button

Press <*OK*> to process the selected ATTACC VSF/LCF Calculator options. If required input data is missing, you will be prompted for the missing data.

Close Button

Press <*Close*> to exit the ATTACC VSF/LCF Calculator.

Help Button

Press <*Help*> to get online MicroSoft (MS)-Windows® help on the use of the ATTACC VSF/LCF Calculator. The online help session provides the same information as this hardcopy software manual. Additional help on the ATTACC methodology is available in the online *ATTACC Handbook* help file.

Processing Messages Display

While the ATTACC VSF/LCF Calculator is processing user requests, processing status comments will be displayed in this message field.

ATTACC VSF/LCF Calculator Output

The ATTACC VSF/LCF Calculator produces several output files. The output depends on the analysis options selected. Each time you run the ATTACC VSF/LCF Calculator, the current output will overwrite the old output. If you want to save any output from earlier runs, you need to save the data with a new name. Figure 11 shows typical program output.

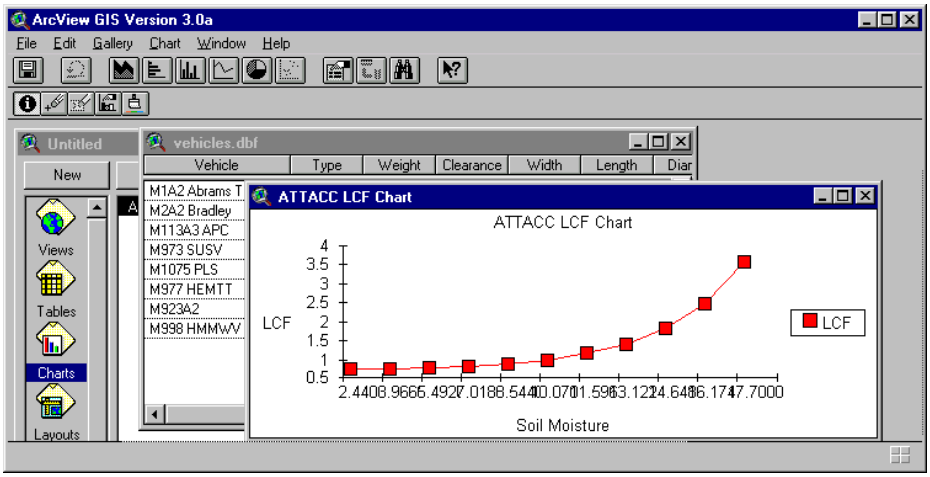

Figure 11. Typical ATTACC VSF/LCF output.

ATTACC LCF Chart

A basic output of the ATTACC VSF/LCF Calculator is the ATTACC LCF chart. The curve depicted in this chart is a graphical representation of the tabular data also provided by the program. Figure 12 shows a typical LCF curve for a specified soil type. This graphic allows the user to easily view the shape of the curve and range of values. Figure 13 shows the same data in tabular format.

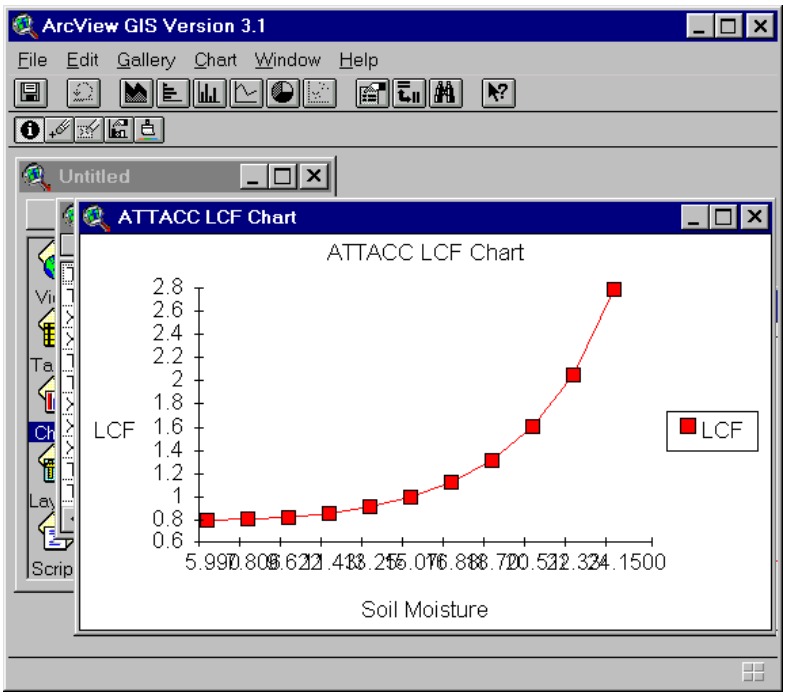

Figure 12. LCF chart.

ATTACC LCF Tabular Data

A basic output of the ATTACC VSF\LCF Calculator is the ATTACC LCF tabular data. This table provides LCF values for a range of soil moisture values for the reference soil type specified. Figure 13 shows a typical LCF table for a specified soil type. This table contains the same data as the LCF output chart.

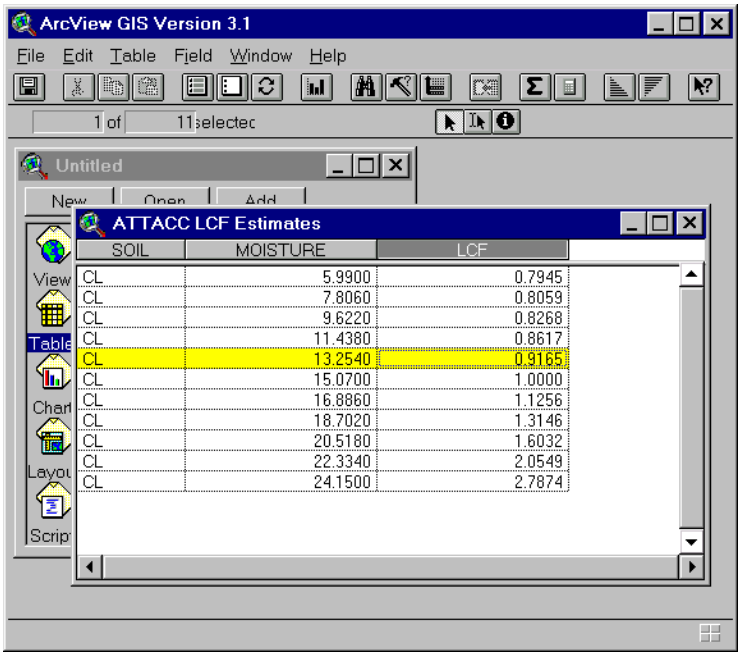

Figure 13. LCF tabular data.

ATTACC VSF Tabular Data

A basic output of the ATTACC VSF\LCF Calculator is the ATTACC VSF tabular data. This table provides VSF values for the list of vehicles provided as input. The VSF values are calculated for the specified reference vehicle, soil type, and reference soil moisture. Figure 14 shows a typical VSF table for a specified soil type.

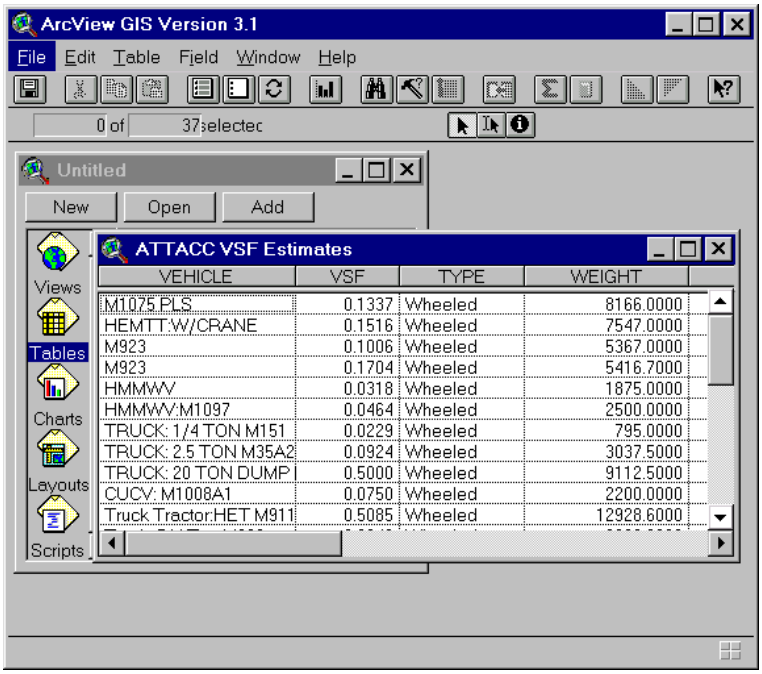

Figure 14. VSF tabular data.

Vehicle Input Data

The ATTACC VSF/LCF Calculator displays the vehicle input data file in the output. This data is only provided for the user's convenience. Figure 15 shows a typical input vehicle file.

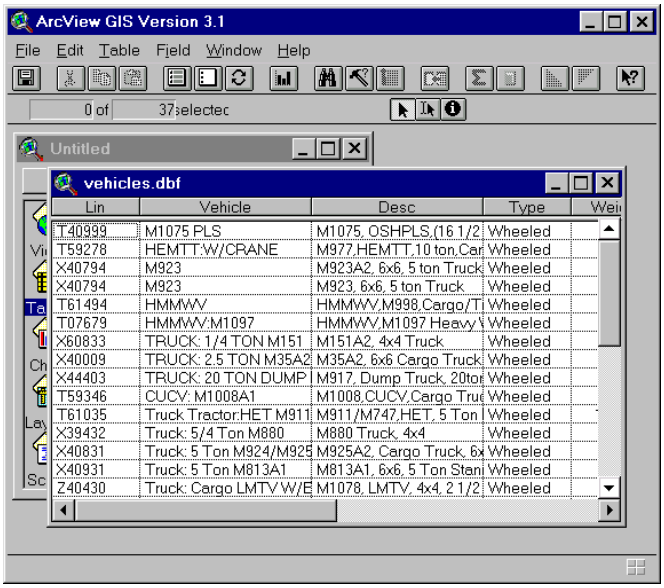

Figure 15. Vehicle input data.

ATTACC VSF/LCF Calculator Online Help

A <*Help*> button is available in the VSF/LCF Calculator input dialog box. This button provides access to two online Windows® help sessions. Figure 16 shows the VSF/LCF Calculator help files dialog box. A VSF/LCF Calculator help session provides information on use of the VSF/LCF Calculator program. The help session provides basically the same information as this VSF/LCF Calculator User Manual. A second help session provides information from the *ATTACC Handbook* on all aspects of the ATTACC program.

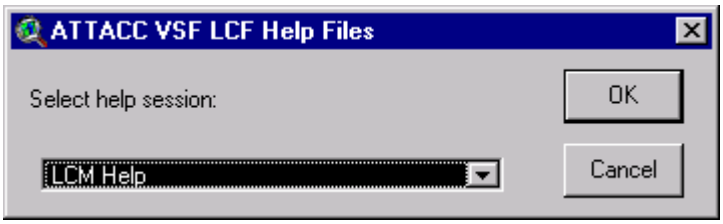

Figure 16. Help session dialog box.

5 Other Technical Aspects of the ATTACC VSF/LCF Calculator

Transferring ATTACC VSF/LCF Data to Other ATTACC Systems

Data are transferred between the VSF/LCF Calculator and other ATTACC programs by copying the data. The VSF/LCF Calculator program automatically saves data to a file in the specified working directory in a format compatible with the AIM program. The file name is that which was specified by the user when the program was run. VSF/LCF Calculator data can also be manually exported to several data formats. Figure 17 shows the export menu option in ArcView. Figure 18 shows the output (export) format options.

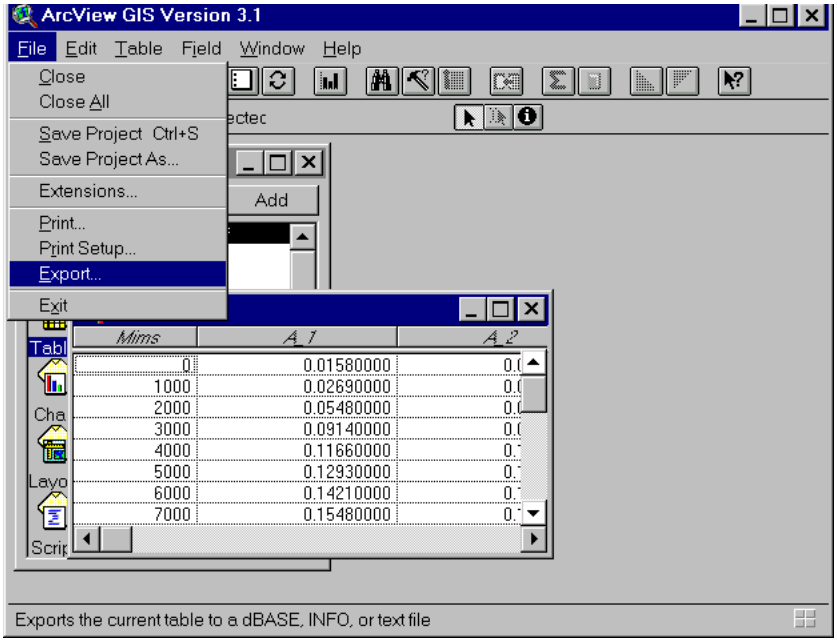

Figure 17. Data export menu option.

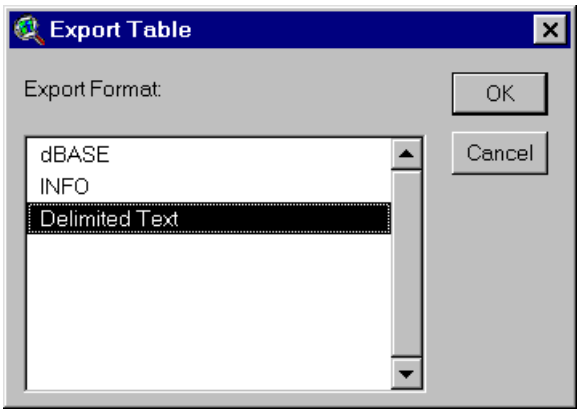

Figure 18. Export data formats.

ATTACC VSF/LCF Calculator Error Messages

The VSF/LCF Calculator ArcView tool displays two types of error messages. First, VSF/LCF Calculator error messages inform you of errors specifically related to using the VSF/LCF Calculator. These error messages are related to the VSF/LCF Calculator scripts. Second, the VSF/LCF Calculator displays error messages generated by ArcView. These error messages are related to ArcView scripts that come with ArcView and are used by the VSF/LCF Calculator scripts.

All VSF/LCF Calculator error messages can be identified by the word "ATTACC" somewhere in the message or dialog box. ArcView error messages will not include the word "ATTACC" anywhere in the message or dialog box.

You will frequently see several messages in succession. The first message is usually the most informative message because it describes the original problem. Subsequent messages usually describe problems resulting from the first problem.

The VSF/LCF Calculator will terminate for major errors and return you to the input dialog box. For minor problems that usually do not affect results, the VSF/LCF Calculator will complete the current analysis.

If you terminate a run of the VSF/LCF Calculator by using the <*Stop*> button, you will usually see a couple of error messages. These error messages can be ignored. They simply indicate that some portion of the script was not completed and may result in invalid output.

ATTACC VSF/LCF Calculator Technical Support

For support using the VSF/LCF Calculator program, contact the following POC. If you identify program bugs or have suggestions for improving the program, please provide this information to the following POC as well.

Alan B. Anderson (ERDC)
Phone: 800-USA-CERL (800-872-2375) ext 6390
Email: alan.b.anderson@erdc.usace.army.mil
Fax: 217-373-7266

ATTACC VSF/LCF Calculator System Requirements

The VSF/LCF Calculator extension requires ESRI ArcView. The extension has been tested with ArcView versions 3.0, 3.1, and 3.2. Hardware and software requirements for ATTACC VSF/LCF Calculator are the same as for ArcView.

References

Anderson, A.B., P. Sydelko, and G. Teachman. 2001. *Army Training and Testing Area Carrying Capacity (ATTACC) Land Condition Module (LCM) User Manual, Version 1.00*. Engineer Research and Development Center/Construction Engineering Research Laboratory (ERDC/CERL) SR-01-10, ADA393636, July 2001.

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Concepts Analysis Agency (CAA). 1996. *Evaluation of Land Value Study (ELVS)*. Study Report CAA-SR-96-5. U.S. Army CAA, Bethesda, MD.

Sullivan, P. and A. B. Anderson. 2000. *A Methodology for Estimating Army Training and Testing Area Carrying Capacity (ATTACC) Vehicle Severity and Local Condition Factors*. ERDC TR-00-02, June 2000, ADA379393.

U.S. Army Engineer Waterways Experiment Station (USAWES). 1960. "The Unified Soil Classification System." Technical Memorandum No. 3-357. U.S. Army Corp of Engineers, Vicksburg, MS.

U.S. Army Environmental Center (USAEC). 1999. *The ATTACC Handbook*. http://www.army-itam.com/main.htm

Acronyms and Abbreviations

AIM	ATTACC Integration Module
ASIP	Army Stationing and Installation Plan
ATSC	Army Training Support Center
ATTACC	Army Training and Testing Area Carrying Capacity
BLTM	Battalion Level Training Model
CAA	U.S. Army Concepts Analysis Agency
CATS	Combined Arms Training Strategy
CD	compact disk
CERL	Construction Engineering Research Laboratory
ELVS	Evaluation of Land Value Study
ERDC	U.S. Army Engineer Research and Development Center
ESF	Event Severity Factor
ESRI	Environmental Systems Research Institute
FTX	field training exercise
GIS	geographical information system
HQDA	Headquarters, Department of the Army
ISEC	U.S. Army Information System Engineering Command
ITAM	Integrated Training Area Management Program
LCF	Local Condition Factor
LCM	Land Condition Module
LCTA	Land Condition Trend Analysis
LRAM	land rehabilitation and maintenance
MACOMs	major Army commands
MIM	Maneuver Impact Mile
MUIR	Map Unit Interpretation Database
NRCS	Natural Resource Conservation Service
ODCSOPS	Office of the Deputy Chief of Staff for Operations and Plans

O&S	operations and support
RFMSS	Range Facility Management Support System
RUSLE	Revised Universal Soil Loss Equation
SERDP	Strategic Environmental Research and Development Program
SOP	standing operating procedure
TIF	Training Impact Factor
TRM	Training Resource Model
USAEC	U.S. Army Environmental Center
USAWES	U.S. Army Engineer Waterways Experiment Station
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
VCF	Vehicle Conversion Factor
VOF	Vehicle Off-Road Factor
VSF	Vehicle Severity Factor
WAM	Workplan Analysis Module

Appendix A: Installing or Removing the ATTACC VSF/LCF Calculator and Related ATTACC LCM Tools

Installing the VSF/LCF Calculator and Related LCM Tools

To manually install any VSF/LCF Calculator, refer to Chapter 2 of the main text for the specific tool and complete instructions.

To use the setup program to automatically install VSF/LCF Calculator, you will need to have the ATTACC LCM Installation CD. Not all versions of the ATTACC LCM Installation CD have the VSF/LCF Calculator software included. The process for installing the VSF/LCF Calculator is identical to the installation of other ATTACC components. The process only differs by the software extensions you select to install.

To use the setup program to automatically install VSF/LCF Calculator and related ATTACC LCM tools on your computer, insert the ATTACC LCM CD into your CD drive. Select the <*Start*> button on the Windows® button bar at the bottom of your screen. Select the <*Run*> menu item. A run program dialog box will appear (Figure A1). Enter *"drive:\setup.exe*" in the text-input box where "*drive*" is the CD drive letter. You may also use the <*Browse*> button to locate and select the "*setup.exe"* file (Figure A2). Then select <*OK*>. The ATTACC LCM installation program will begin.

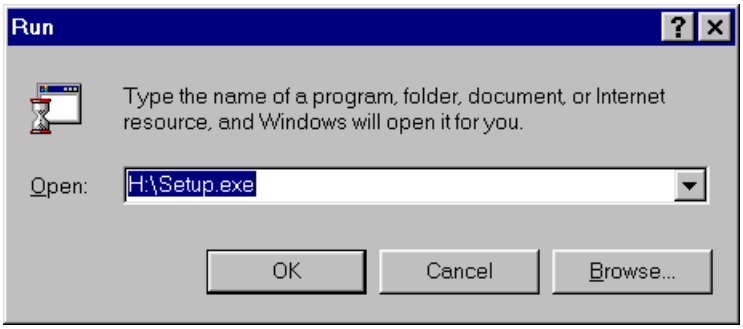

Figure A1. Windows® run program dialog box.

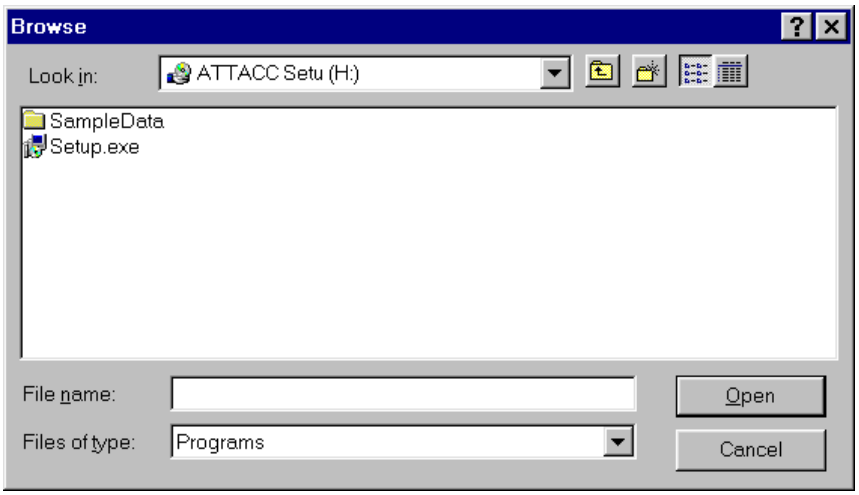

Figure A2. Browse dialog box used to locate the installation program.

You will see the ATTACC setup initialization screen (Figure A3). After a few seconds the initialization process will be complete and the ATTACC LCM installation setup welcome screen (Figure A4) will appear. If you do not see the welcome dialog box, you already have a version of the ATTACC LCM installed on your computer. See the *Removing and Updating ATTACC LCM and Related Tools* section of this appendix if you already have a version of the ATTACC LCM installed. Select <*Next*> to continue or <*Cancel*> to terminate the installation. You may cancel the installation at anytime and all installation files will be removed from your computer system.

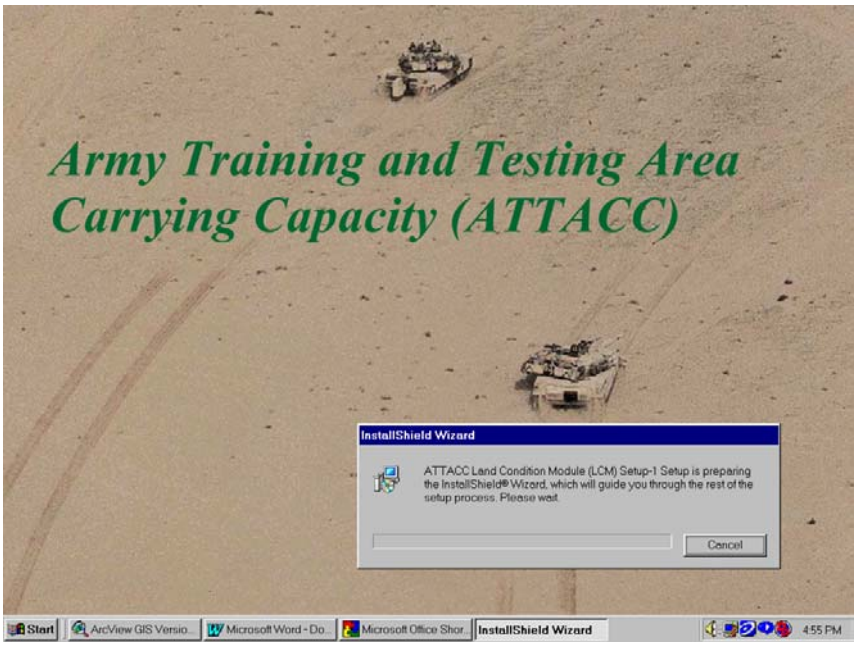

Figure A3. ATTACC LCM installation program initialization screen.

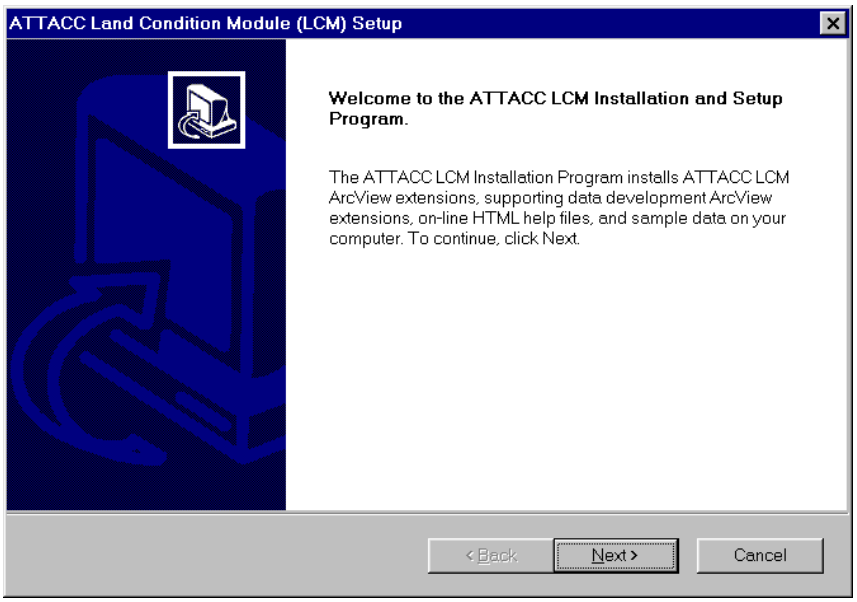

Figure A4. ATTACC LCM installation welcome screen.

A series of three dialog boxes will prompt you to provide file locations for the ATTACC LCM extension, online help, and sample data (Figures A5, A6, and A7). Each dialog box provides information concerning required file locations. Use the <*Browse*> button to access the locate file directories dialog box. Use the <*Back*> button to return to earlier ATTACC LCM installation dialog boxes to correct previously provided information. Select the <*Next*> button to proceed to the next input dialog box.

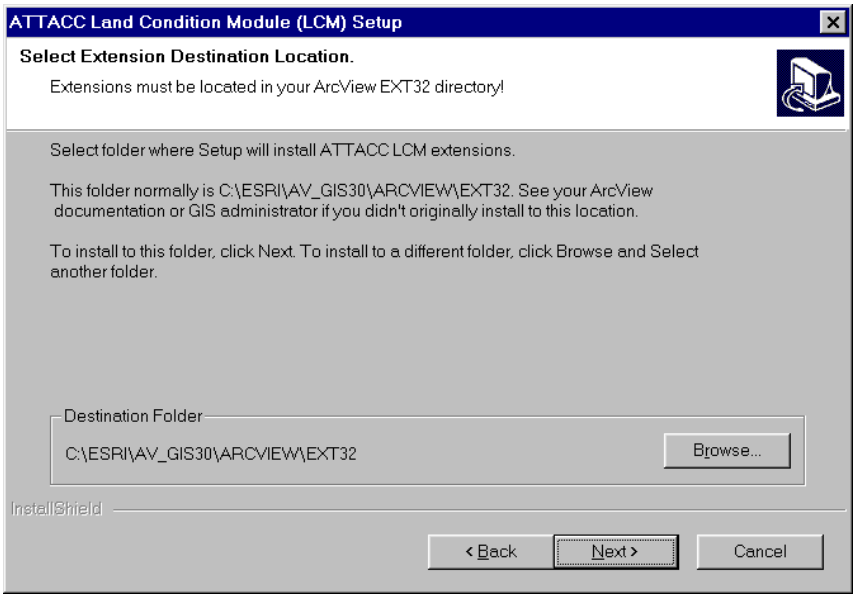

Figure A5. ATTACC LCM installation program dialog box to specify destination folder for ATTACC LCM extension files.

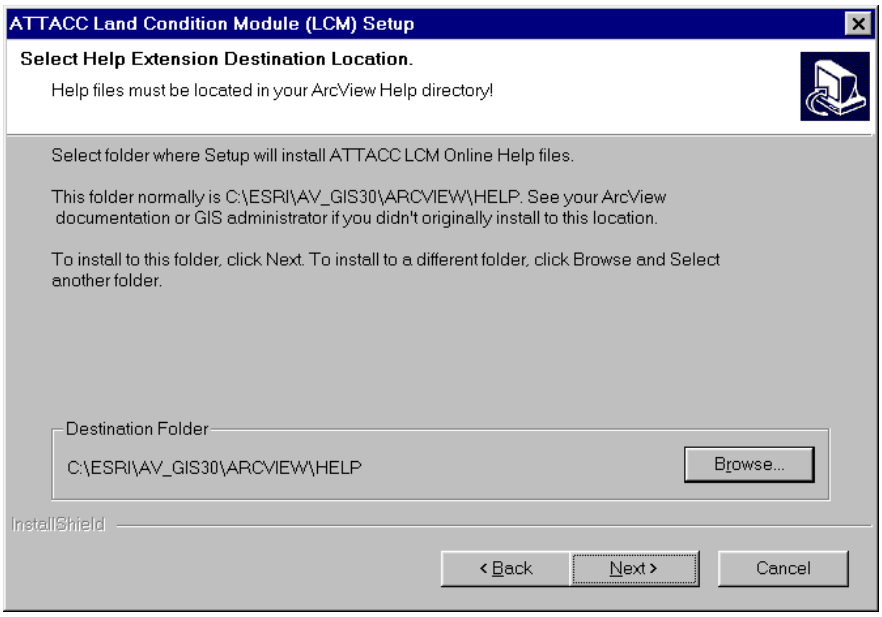

Figure A6. ATTACC LCM installation program dialog box to specify destination folder for help files.

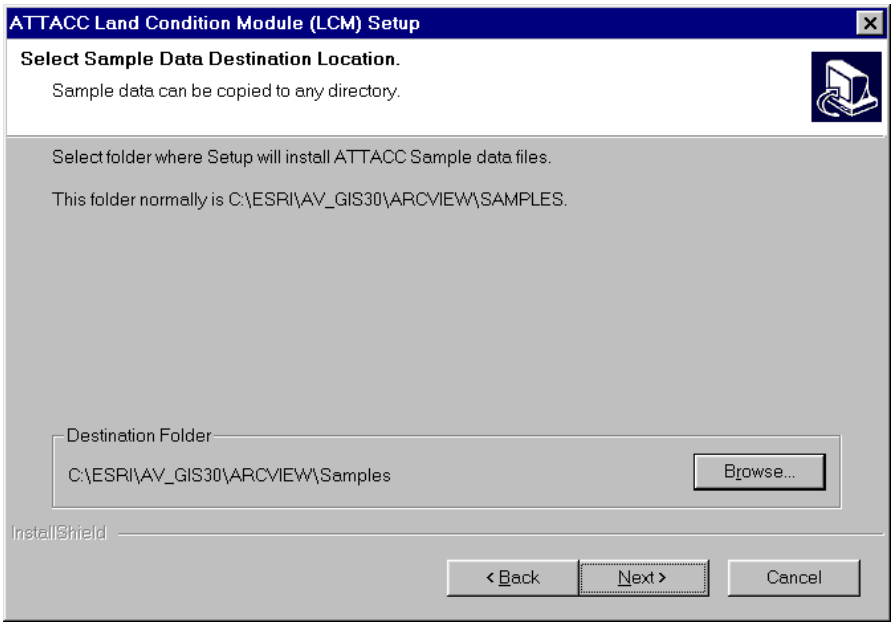

Figure A7. ATTACC LCM installation program dialog box to specify destination folder for sample data files.

After specifying file locations, you will need to specify the type of installation (Figure A8). The *Typical* installation option will install all Arcview extensions, help files, and sample data. *Compact* installation will install only Arcview extensions and help files. It will not install sample data. *Custom* installation allows you to select the desired extensions, help files, and sample data to install on your computer. Select <*Next*> to proceed with the installation.

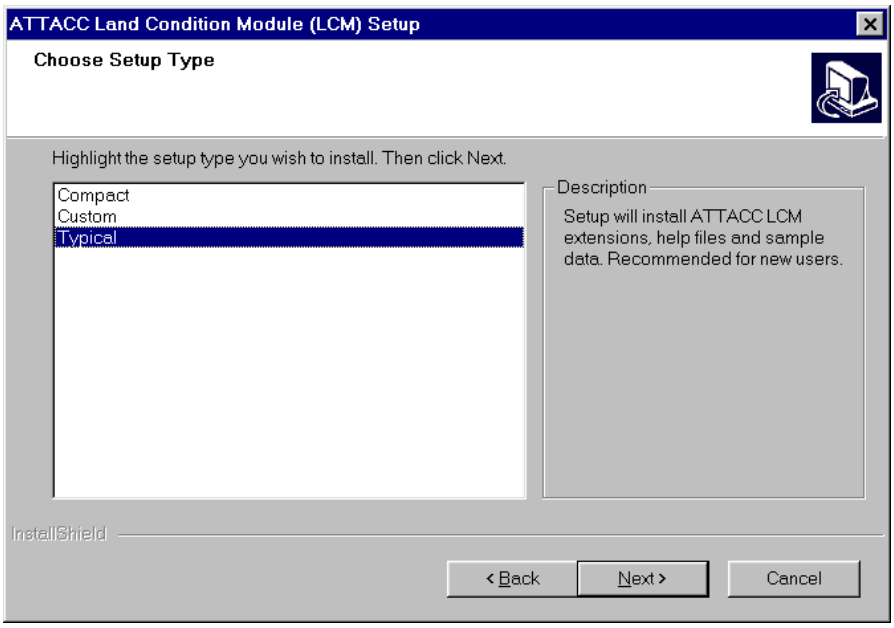

Figure A8. ATTACC LCM installation program Setup Type selection dialog box.

If you selected the *Custom* installation option, you will proceed to the ATTACC LCM installation program Select Components dialog box (Figure A9). This dialog box will not be seen if you selected the *Typical* or *Compact* setup options. Check each file option that you want installed. Highlighting an option provides supplemental information in the description section of the dialog box. Hard drive space requirements for the selected options and available hard drive space are provided at the bottom of the dialog box. Select <*Next*> to proceed with the installation.

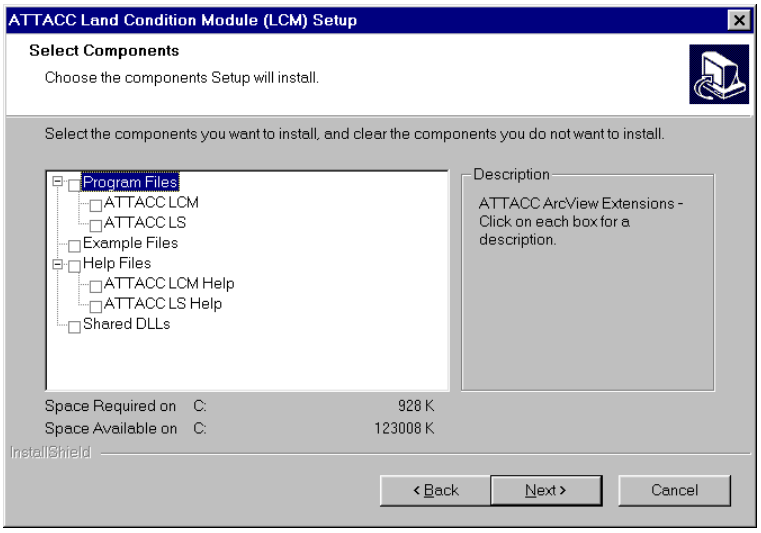

Figure A9. ATTACC LCM installation program Select Components dialog box.

You will need to designate a program folder or file group (Figure A10). This can be an existing file group or a new file group. The installation program defaults to the "*ATTACC LCM*" file group. You will probably want to accept the default value. Select <*Next*> to proceed with the installation.

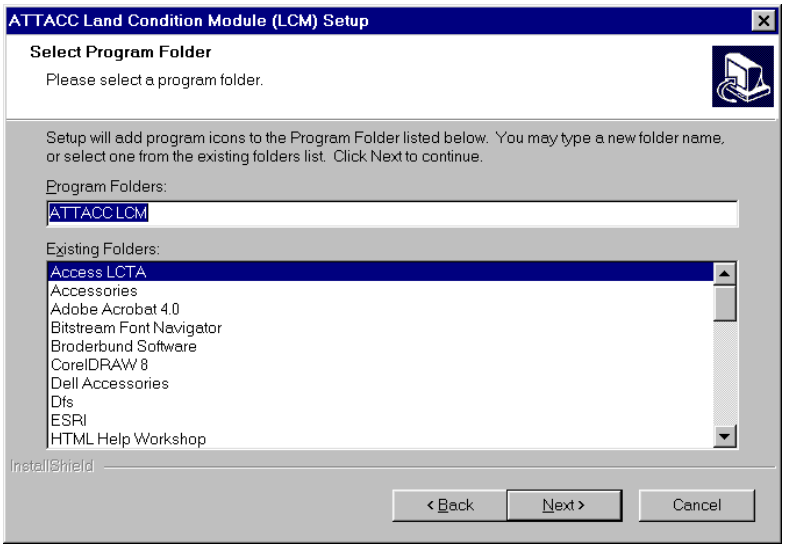

Figure A10. ATTACC LCM installation Program Folder selection dialog box.

The ATTACC LCM installation program will now install the selected files. The ATTACC LCM installation program Setup Status dialog box (Figure A11) will keep you informed of installation progress.

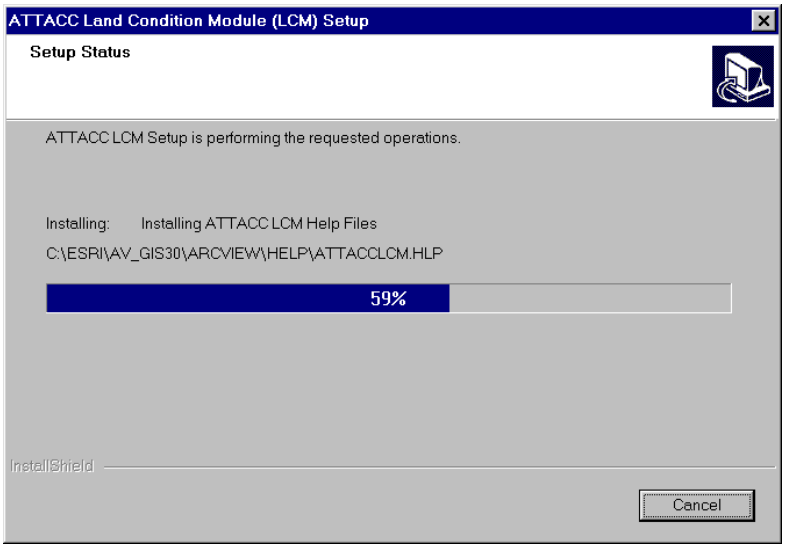

Figure A11. ATTACC LCM installation program Setup Status dialog box.

When you see the ATTACC LCM installation program completion screen (Figure A12), the installation is complete. Select <*Finish*> to exit the ATTACC LCM installation program.

Figure A12. ATTACC LCM installation program completion screen.

Removing and Updating ATTACC LCM and Related Tools

Use the MS-Windows® *Add/Remove Programs* utility to remove the VSF/LCF Calculator software, add other ATTACC modules, or load a newer version. To use this utility, select the <*Start*> button of the Windows® button bar at the bottom of your screen. Select the <*Settings*> menu item. Then select the <*Control Panel*> menu item. You should see the Control Panel dialog box (Figure A13). Run the *Add/Remove Programs* utility by selecting the icon.

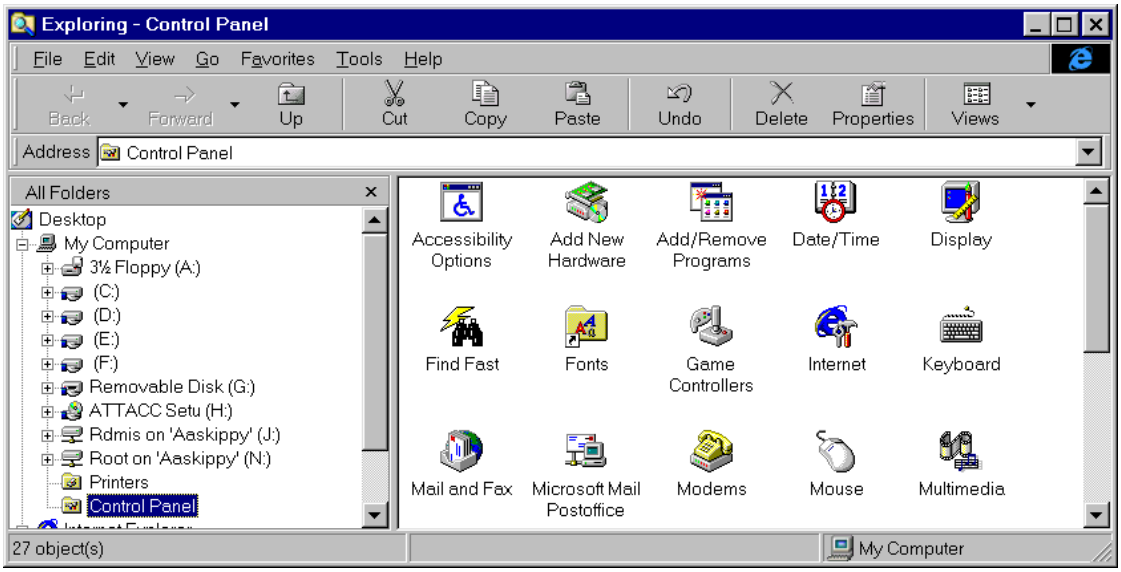

Figure A13. Control Panel dialog box.

The Add/Remove Programs dialog box (Figure A14) now appears. Locate and highlight the *ATTACC LCM* program group. Then use the <*Add/Remove*> button to start the ATTACC LCM remove/update program.

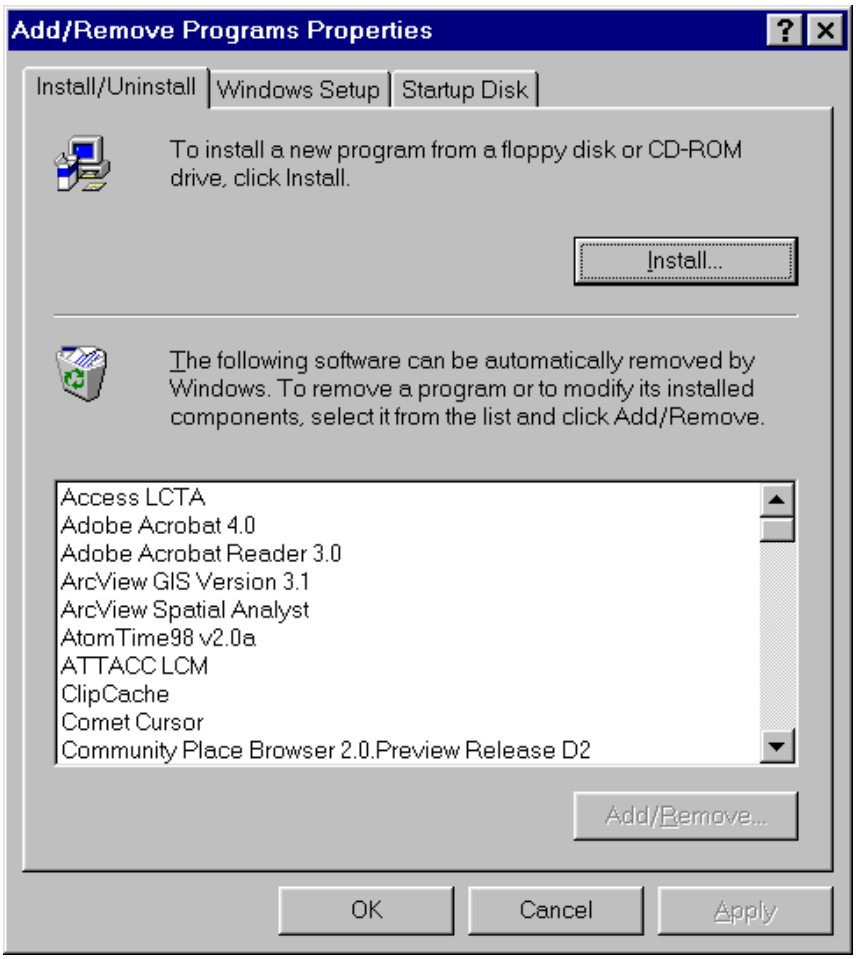

Figure A14. Add/Remove Programs dialog box.

After the ATTACC LCM remove/update program begins, you will see the uninstall program options dialog box (Figure A15). Select the <*Remove*> option to remove all ATTACC LCM components installed on your computer. This option will remove all installed files but will not remove any data files created by the ATTACC LCM program. Select the <*Repair*> option to reinstall the same components originally installed. Use this option if you have corrupted or deleted any files originally installed. Select the <*Modify*> option to add or remove selected ATTACC LCM components. Use this option to remove components no longer needed (i.e., sample data) or add components that were not originally installed. Select <*Next*> to proceed with the remove/update program.

Figure A15. ATTACC LCM remove/update program options dialog box.

If you selected the *Modify* option, you will see the program maintenance and uninstall dialog box (Figure A16). This dialog box will not be seen if you selected either the *Repair* or *Remove* option. Check each file option that you want installed and uncheck each file option you want removed. Highlighting an option provides supplemental information in the description section. Hard drive space required for the selected options and available hard drive space are provided at the bottom of the dialog box. Select the <*Next*> button to proceed with the installation.

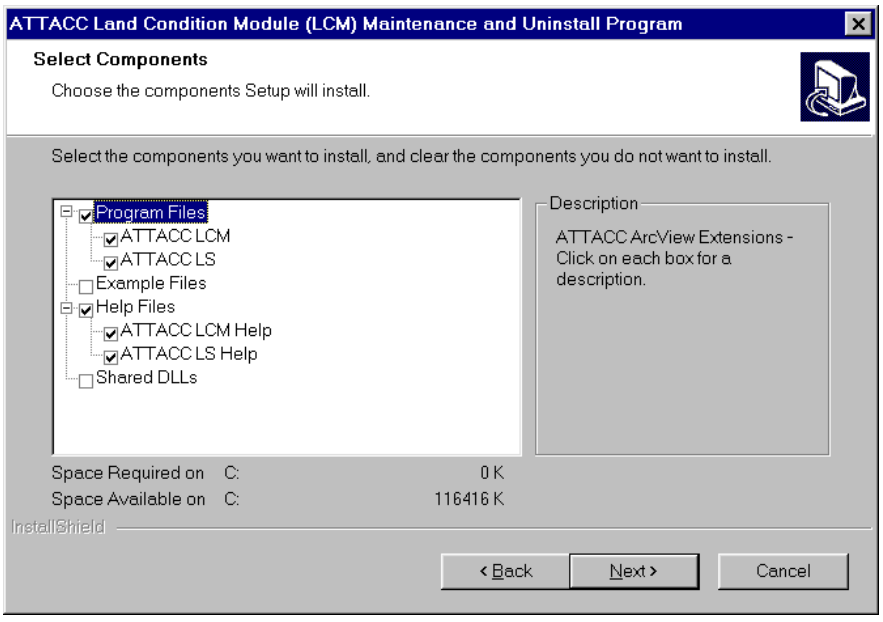

Figure A16. ATTACC LCM installation program maintenance and uninstall dialog box.

The Setup Status dialog box will appear as your remove/update options are processed (Figure A17). You will see this dialog box regardless of the remove/update options selected.

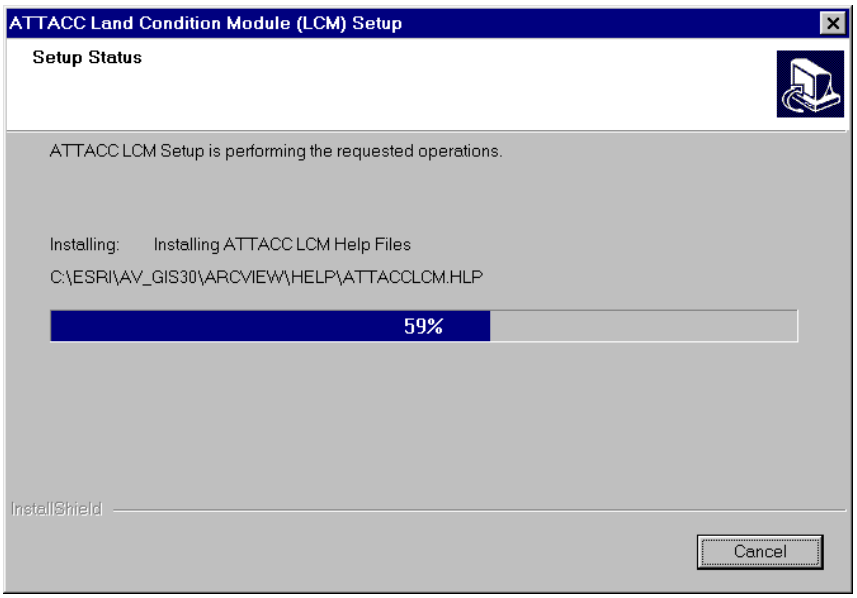

Figure A17. ATTACC LCM remove/update program Setup Status dialog box.

When you see the ATTACC LCM remove/update program completion dialog box, the remove/update is complete (Figure A18). Select the <*Finish*> button to exit the ATTACC LCM remove/update program.

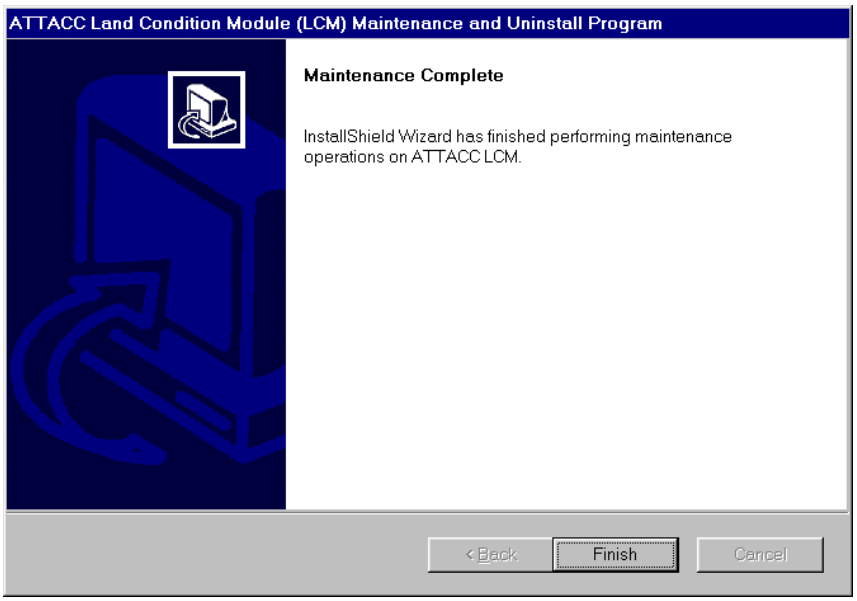

Figure A18. ATTACC LCM remove/update program finish dialog box.

Appendix B: Installation Information Infrastructure Architecture (I3A) Technical Review Process for ATTACC LCM

The Army CIO instituted the I3A Technical Review Process to ensure that all systems being fielded on Army installations are coordinated and reviewed for infrastructure and communications impacts. Program Managers were asked to coordinate their system designs with the U.S. Army Information System Engineering Command (ISEC) to ensure that the proposed fielded system fits within the Army's installation architecture. The ATTACC LCM version 1.0 systems architecture information was submitted for system approval and was ISEC approved (Anderson et al 2001). During the release of ATTACC LCM version 2.0, it was determined by ISEC that continued upgrades to the software that did not change the system architecture were also considered approved systems (personal communications, Gordon Weith, ATSC).

The VSF/LCF Calculator software was developed to the same system architectural standards as the ATTACC LCM software. As such the VSF/LCF Calculator meets the ISEC system architecture guidelines.

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14. ABSTRACT

ATTACC is the standard ITAM methodology for estimating training land carrying capacity by relating training load, land condition, and land maintenance practices. Various decision support tools have been developed to simplify and automate the ATTACC methodology. These decision support tools include the Workplan Analysis Module (WAM), ATTACC Integration Module (AIM), ATTACC functions of the Range Facility Management Support System (RFMSS), and Land Condition Module (LCM).

The VSF/LCF Calculator is an ArcView GIS-based software application that estimates ATTACC Vehicle Severity Factor and Local Condition Factor values for installations based on installation site data and standard military vehicle data.

15. SUBJECT TERMS
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